Space Weather Forecast

Issued on Monday, 14 March 2022 at 01:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME arrived on the 13th, with G1/Minor geomagnetic storms expected early on Day 1 (14th) with a chance of G2/Moderate storm. Reducing risk of further M-Class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with only common class flares observed, although the largest flare was from a region of an old sunspot, rather than any of the four sunspot regions on the disc. The largest of these, a bipolar string of small spots in the northeast disc, which has shown development but remains relatively stable. The other large region in the southwest, with the largest individual spot, is showing little sign of flare activity. Other regions are generally small and stable. No Earth directed coronal mass ejections (CMEs) have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: Background solar wind speeds become elevated with the arrival of a CME at 13/1014 UTC, with solar winds peaking at 586km/s, before settling at slightly elevated levels, near 460km/s. This was accompanied by the weak magnetic field becoming strong, Although initially strongly positive (northward) in the important north-south (Bz) direction, this soon rotated to be strongly negative (southward). Geomagnetic activity was Quiet (Kp 0-2) initially, before increasing to Active (Kp 4) 13/0900-1200 UTC, reaching G1/Minor Storm (Kp 5) between 13/1200-2100 UTC, with a G2/Moderate Storm (Kp 6) observed at 13/1200-1500 UTC and 13/2100-0000 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be mainly Low, perhaps Moderate, with a chance of M-class flares. The risk of M-flares mainly comes from AR2965 through Day 1 (14th), with the risk slightly reduced now AR2965 has rotated off the disc.

Solar Wind / Geomagnetic Activity: Ongoing CME effects are expected early day 1 (14th), with G1/Minor Geomagnetic Storms expected and a chance of G2/Moderate geomagnetic storms. Once Earth exits the trailing portion of the CME day 1 (14th), solar winds are expected to gradually ease to background levels, with no further enhancements expected. Geomagnetic activity will then gradually return to largely Quiet conditions with isolated Unsettled intervals Days 2-4 (15-17th).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to be at background with no solar radiation storms occurring. Although there is very slight chance of this increasing in response to any flares that occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	70	20	1	1
Strong	G3	No	2	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	15	10	10
Very Active	R3 to R5 X	No	2	2	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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